CLAIMS

I claim:

1. A dielectric material forming method comprising:

forming a first monolayer;

forming a second monolayer on the first monolayer, one of the first and second monolayers comprising tantalum and oxygen and the other of the first and second monolayers comprising oxygen and another element different from tantalum; and

forming a dielectric layer comprising the first and second monolayers, the dielectric layer exhibiting a dielectric constant greater than the first monolayer.

2. The method of claim 1 wherein the first monolayer comprises tantalum and oxygen.

3. The method of claim 1 wherein the second monolayer comprises tantalum and oxygen.

4. The method of claim 1 wherein the first monolayer comprises tantalum pentoxide.

5. The method of claim 1 wherein the another element comprises a Group IB to VIIIB element.

6. The method of claim 1 wherein the forming of the dielectric layer comprises annealing.

7. The method of claim 1 wherein the forming of the first or second monolayer comprises atomic layer depositing.

8. A dielectric material forming method comprising:

chemisorbing a first dielectric material on a substrate;

chemisorbing a second dielectric material on the first material, one of the first and second materials comprising oxygen and a metal element; and

forming an enhanced dielectric material comprising the first and second materials, the enhanced dielectric material exhibiting a dielectric constant greater than the first material.

9. The method of claim 8 wherein the metal element comprises a Group IB to VIIIB element.

10. The method of claim 8 wherein the first material comprises oxygen and a Group IB to VIIIB element.

11. The method of claim 8 wherein the second material comprises oxygen and a Group IB to VIIIB element.

12. The method of claim 11 wherein the first material comprises tantalum pentoxide.

13. The method of claim 8 wherein the metal element comprises titanium or zirconium.

14. The method of claim 8 wherein the one of the first and second materials further comprises a different metal element.

15. The method of claim 14 wherein the one of the first and second materials comprises oxygen, titanium, and zirconium.

16. The method of claim 8 wherein at least one of the first and second materials consists of a monolayer.

17. The method of claim 8 wherein the chemisorbing of the first or second material comprises atomic layer depositing.

18. The method of claim 8 wherein the forming of the enhanced dielectric layer comprises annealing.

19. The method of claim 8 wherein the enhanced dielectric material further exhibits less current leakage than the first dielectric material.

20. A dielectric material forming method comprising:

chemisorbing alternated monolayers of a first dielectric material and a second dielectric material over a substrate; and

providing fewer monolayers of the second material compared to the first material, the first material comprising tantalum and oxygen and the second material comprising oxygen and at least one Group IVB element.

21. The method of claim 20 wherein from about 2% to about 20% of the monolayers comprise second material monolayers.

22. The method of claim 20 further comprising approximately evenly interspersing the second material monolayers among the first material monolayers.

23. The method of claim 20 further comprising chemisorbing a majority of the second material monolayers on an underlying second material monolayer.

24. The method of claim 20 wherein the first material comprises tantalum pentoxide.

25. The method of claim 20 wherein the Group IVB element comprises at least one of titanium and zirconium.

26. The method of claim 20 wherein the chemisorbing of the monolayers comprises atomic layer depositing.

27. The method of claim 20 further comprising annealing the monolayers.

28. A dielectric material forming method comprising:

atomic layer depositing an oxide of a Group IVB metal on a first dielectric material comprising tantalum oxide; and

forming a second dielectric material comprising the Group IVB metal oxide and the first dielectric material.

29. The method of claim 28 wherein the atomic layer depositing comprises:

chemisorbing at least one Group IVB metal precursor on the first dielectric material;

purging chemisorption byproducts and excess metal precursor from over the substrate;

chemisorbing an oxygen precursor on the chemisorbed Group IVB metal; and

purging chemisorption byproducts and excess oxygen precursor from over the substrate, a chemisorption product of the at least one Group IVB metal precursor and the oxygen precursor comprising at least one Group IVB metal oxide.

30. The method of claim 29 wherein the at least one Group IVB metal precursor comprises two Group IVB metal precursors.

31. The method of claim 28 further comprising forming the first dielectric material by atomic layer depositing.

32. The method of claim 28 wherein the tantalum oxide comprises tantalum pentoxide.

33. The method of claim 28 wherein the forming of the dielectric layer comprises annealing.

34. The method of claim 28 wherein the Group IVB metal comprises at least one of titanium and zirconium.

35. A dielectric material forming method comprising:

atomic layer depositing a plurality of monolayers, each of the plurality of monolayers comprising both an oxide of a Group IVB metal and tantalum oxide; and

forming a dielectric material comprising the Group IVB metal oxide and the tantalum oxide, the dielectric material exhibiting a dielectric constant greater than that of tantalum oxide.

36. A dielectric layer comprising a first monolayer comprising tantalum and oxygen and a second monolayer comprising oxygen and another element different from tantalum, the dielectric layer exhibiting a dielectric constant greater than the first monolayer.

37. The dielectric of claim 36 wherein the first monolayer comprises tantalum pentoxide.

38. The dielectric of claim 36 wherein the another element comprises a Group IB to VIIIB element.

39. A dielectric material comprising first and second chemisorbed materials, the second material comprising oxygen and a Group IB to VIIIB element and the dielectric material exhibiting a dielectric constant greater than the first chemisorbed material.

40. The dielectric of claim 39 wherein the first material comprises tantalum pentoxide.

41. The dielectric of claim 39 wherein the Group IB to VIIIB element comprises titanium or zirconium.

42. The dielectric of claim 39 wherein the second material further comprises a different Group IB to VIIIB element.

43. The dielectric of claim 39 wherein at least one of the first and second materials consists of a monolayer.

44. The dielectric of claim 39 wherein the dielectric material further exhibits less current leakage than the first dielectric material.

45. An enhanced dielectric material comprising alternated chemisorbed monolayers of a first dielectric material and a second dielectric material over a substrate, the enhanced dielectric material comprising fewer monolayers of the second material compared to the first material, the first material comprising tantalum and oxygen, and the second material comprising oxygen and at least one of a Group IVB element.

46. The dielectric of claim 45 wherein from about 2% to about 20% of the monolayers comprise second material monolayers.

47. The dielectric of claim 45 wherein the second material monolayers are approximately evenly interspersed among the first material monolayers.

48. The dielectric of claim 45 wherein a majority of the second material monolayers contact an underlying second material monolayer.

49. The dielectric of claim 45 wherein the first material comprises tantalum pentoxide.

50. The dielectric of claim 45 wherein the Group IVB element comprises at least one of titanium and zirconium.